

"Fresh E-commerce + Cold Chain Logistics" Helps the Smooth Flow of Characteristic Fresh Agricultural Products

--Take Strawberry in Changfeng as an Example

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Abstract

The improvement of living standards is accompanied by a substantial increase in demand for fresh products. However, fresh products are prone to decay during transportation. In order to provide customers with high-quality products, e-commerce + cold chain transportation is required. This paper takes the development of strawberry e-commerce in Hefei Changfeng as an example to study the development of e-commerce + cold chain transportation. Through consulting data, field research and multi-angle analysis, we found the problems in its e-commerce development and cold chain logistics, and put forward reasonable suggestions for its e-commerce + cold chain model with the goal of promoting the better development of Hefei Changfeng Strawberry.

Keywords

Fresh products; Online retailers; Cold chain logistics.

1. Introduction

After 2010, China has become the second largest economy in the world, and the consumption of Chinese residents has gradually shifted from food and clothing consumption to enjoyment consumption. Health and taste have become people's current demand for food. Strawberries with soft, juicy and sweet taste are more and more popular with the public. Changfeng County, Hefei City, Anhui Province, is one of the top ten strawberry producing areas in China. Its Changfeng strawberries are popular with consumers everywhere. However, with the development of modern economy, the traditional offline point-to-point sales can no longer meet the needs of consumers. Especially affected by the epidemic, people's travel is restricted. Even if they hear the reputation of Hefei Changfeng Strawberry, they can't buy it in person. Therefore, it is necessary to develop the sales of e-commerce mode, but in the process of sales, in addition to e-commerce sales, there is also the problem of strawberry cold chain transportation. This paper studies the e-commerce sales and cold chain logistics of Changfeng Strawberry, and puts forward corresponding suggestions, which is of great significance to the sustainable development of residents' lives and industries.

China formed a cold-chain industrial chain in 2008 and is currently at a rapid development stage. However, a mature cold chain logistics industry chain has been formed in foreign countries around 2000, and China needs to strengthen the importance of cold chain logistics. The number of domestic literature on cold chain logistics is increasing, but the number of

literature that can guide farmers is still insufficient. Therefore, this paper combines e-commerce model with cold chain logistics, hoping to bring feasible suggestions to farmers.

Through browsing a large number of documents, documentaries, related videos and field research, we can understand the current situation of the development of Changfeng strawberry industry. This paper analyzes the problems in the development of online sales of Changfeng strawberry from three aspects: farmers, e-commerce model and logistics, and then designs the strategy of developing e-commerce sales of Changfeng strawberry based on the relevant theories of fresh e-commerce and cold chain logistics, so as to promote the development of Changfeng strawberry industry.

2. Development Status of Strawberry Industry in Changfeng

2.1. Current situation of consumers

With the rapid development of the economy and the reduction of Engel's coefficient, people have gone from the original pursuit of food and clothing to the pursuit of diversification of the diet structure. With the rapid growth of strawberry demand in China, more and more consumers love and pursue this fruit with high nutritional value. According to statistics, by 2020, China's strawberry demand was 3.444 million tons, up 5.23% year on year. From the perspective of consumers, there are three main channels to buy fruit: self-picking, offline purchase and online retail. Strawberry in Changfeng County, Hefei City, Anhui Province is "the hometown of strawberries in China". The production scale of Changfeng Strawberry is the first in the country. The product is fragrant and has become the first choice of local people and has also received the favor of consumers all over the country. For strawberries, many qualified consumers like to pick strawberries in the strawberry shed. Not only are the products more secure, but also they can experience the original ecological green journey. Although self-picking is a little more expensive than offline and online purchase, it is more popular with consumers because it can be selected by itself and its green and freshness are guaranteed. It can be seen from this that the quality of strawberry is dominant, and online sales must solve the problem of quality assurance.

2.2. Current situation of strawberry farmers

According to relevant reports, in 2022, the strawberry planting area in Changfeng County will reach 210000 mu, the output will exceed 360000 tons, the average benefit per mu will reach 40000 yuan, and the total output value and brand value are expected to exceed 10 billion yuan. There are about 80000 full-time employees in the county, which indirectly radiates and drives 360000 people, and some growers are taking shape in production, including but not limited to family farms, production cooperatives and technology limited companies. The intensification, scale, specialization and technology of strawberry production have made the strawberry industry grow into the main industry for Changfeng farmers to become rich.

Because of the particularity of strawberries, strawberry farmers adopt a variety of marketing models. Sightseeing garden style: consumers pick strawberries by themselves, and each person will charge about 20 yuan for entering the garden. Strawberries can be eaten freely in the garden, and about 20-30 yuan/jin for picking strawberries in the garden. This method avoids the loss of strawberries in transportation and packaging costs, reduces costs, but there is a risk of unsalable. Traditional transportation wholesale: After picking strawberries, farmers use plastic boxes and cartons to pack them, and then seal them with plastic wrap to store them in a cool place and transport them to the sales place for sale. According to berry farmers, local strawberries are sold to nearly 20 cities across the country, including Fengying supermarket chain. In order to expand its business, berry farmers also carry out online sales. In order to ensure the quality and transportation of strawberries, farmers use sponge punching method

for packaging. Put strawberries one by one into the empty foam space and fix them. Put sponge pads at the bottom and top of the box to shock absorption. Put strawberries head up and bottom down when placing them. Finally, put ice bags in the express box to keep warm. Online sales have greatly reduced the time and space distance and broadened the market, but there are problems such as increased transportation costs, difficulty in keeping fresh, and difficulty in transportation. Berry farmers are generally reluctant to choose online stores.

According to the survey of online merchants, berry farmers are more inclined to wholesale sales, and online sales are just icing on the cake. China is now in the post-epidemic era, and the epidemic is volatile, which will undoubtedly cause a huge impact on agricultural production and sales. For example, in order to avoid crowd gathering, the strawberry sales in the sightseeing garden had to be stopped. The offline stall and wholesale became extremely difficult due to the break of the industrial chain. A large number of strawberries were unsalable and the losses of strawberry farmers were huge.

2.3. Logistics status of Changfeng strawberry

2.3.1. Farmers' understanding of logistics

The characteristic agricultural products mainly planted by farmers in Changfeng County include strawberries, grapes, etc., which are currently sold to Beijing, Shanghai, Guangzhou and other places. These fruit products have different requirements for transportation. Most strawberry farmers do not carry out fine processing of strawberries when picking. They use ordinary vehicles to transport strawberries in the close market during transportation, which can not guarantee the preservation environment of fresh fruits is easy to cause deterioration and decay. In the logistics industry of Hefei, Baogong and Shunfeng are the leading enterprises with high refrigerated and fresh-keeping transportation technology, but other logistics companies still choose traditional transportation methods to reduce costs. In terms of logistics choice, berry farmers tend to choose logistics companies with lower prices to obtain higher profits, and abandon more high-quality Shunfeng and Baogong companies.

2.3.2. Logistics volume affected by demand and epidemic situation

With the great improvement of material life and the rapid development of science and technology, people's demand for fresh fruit is expanding. Changfeng strawberry fruit is sweet and juicy, with good quality. Its sales market covers Beijing, Guangzhou, Fuzhou, Hong Kong and other places, and even exported to Japan, South Korea, Russia and other countries. The annual output of strawberry planting base in Changfeng County is up to 350000 tons. In recent years, due to the epidemic, the online sales of strawberries have decreased from 30% of the original total output to 19.2% of the total output, and the strawberry is facing the problem of slow sales.

2.3.3. Basic conditions of logistics

Strawberries are perishable and not easy to be transported over long distances, so the preservation and cold storage technology is the key to the development of Changfeng strawberry logistics. Although the railway and highway are connected, the relevant infrastructure in Changfeng County is still not perfect, such as the packaging and transportation of refrigerated vehicles, cold storage, fresh agricultural products, and information communication. The online sales of farmers mostly rely on logistics companies, but the transportation quality and delivery time of these third-party platforms cannot be guaranteed.

2.3.4. Uncertainty of logistics demand

Strawberries are seasonal fruits, which are planted in greenhouses and listed in the first quarter of each year. The output of strawberries in the peak season cannot meet the huge demand of the market, while the output of strawberries planted in the greenhouse is huge in the off-season, and the market demand is reduced. The mismatch between supply and demand leads to the

mismatch between the buyer and the seller, and accordingly, the logistics demand is also affected.

3. Problems in Online Sales of Changfeng Strawberries

3.1. Problems of farmers

3.1.1. Environmental protection problems in planting

Healthy and high-quality strawberry seedlings are the guarantee of economic benefits. The local strawberry seedlings have poor resistance to insect pests, and are vulnerable to extreme weather, causing huge losses. At present, Changfeng County has mainly red strawberries, which have gradually eliminated the previous varieties. However, there are still problems such as poor cold and drought resistance, high requirements for soil quality, susceptibility to powdery mildew, and poor resistance to insect pests, which are not conducive to the expansion and development of Changfeng strawberries. Strawberry cultivation technology has not yet been updated. Since 2002, plastic film planting has been implemented. Although it can effectively cope with the water shortage of strawberries caused by weather and other factors and the decline of strawberry yield due to the decrease of temperature, it does not conform to the current environmental protection concept.

3.1.2. Strawberries are not graded after picking

Most local farmers choose traditional hand-picking. The staff pushes a small cart to pick fresh and qualified strawberries along the vegetable border and put them into plastic boxes (260 * 160 * 85cm). After filling them, they put them into cartons and transport them to other places by truck. Strawberry farmers did not subdivide large and small fruits when picking, and the quality of strawberries in a box was uneven, which could not meet the different needs of different people and could not maximize the benefits.

3.1.3. Pretreatment

The quality of the sample can be significantly improved by pretreatment. The fruit pretreatment includes a series of operations such as grading, trimming and emptying. Changfeng strawberries are deficient in pre-treatment. The berry farmers did not accurately grade the big and small fruits when picking, which is not conducive to the whole box of fruit packaging for sale. Due to the lack of refrigeration hardware facilities in Changfeng County, the contradiction between the lack of local refrigeration technology and the huge demand for fruit freezing and preservation has seriously affected the online sales of Changfeng strawberries, making it difficult to expand the strawberry market.

3.2. E-commerce model

At present, China's social and economic development is rapid, and the competition among various industries in the market is more intense. Especially in the era of the impact of the epidemic, some enterprises have been eliminated in a special environment. Enterprises must face greater challenges if they want to survive and develop. In order to have its own competitive advantage, it is necessary to improve the management mode of enterprises, learn from advanced management ideas, and use scientific and technological means to promote the sales of agricultural products. As an emerging industry in recent years, e-commerce has risen rapidly. Due to its advantages of high efficiency and low cost, this consumption mode is increasingly favored by people. Changfeng Strawberry should grasp this focus, improve the popularity of strawberries, expand the scope of sales, and promote the long-term survival and development of the industry through online marketing. However, at present, Changfeng Strawberry still faces great difficulties in developing e-commerce sales.

3.2.1. The sales channel is single and the development foundation of e-commerce is poor

According to statistics, Changfeng strawberries purchased by dealers account for 66.8%, Changfeng strawberries picked by consumers themselves and sold as gifts account for 8%, and Changfeng strawberries connected by farmers and large supermarkets account for 2%; Changfeng strawberries sold in online stores, WeChat, live broadcast and other online ways account for 19.2%, Changfeng strawberries sold in farmers' stalls account for 1%, and other ways account for 3%. It can be seen that online sales are relatively small, and traditional sales methods still occupy a major position in local sales methods. The weak development foundation of online sales of Changfeng strawberries has hindered the transformation and upgrading of the strawberry industry, and affected the expansion of market share and further sales of Changfeng strawberries. In addition, due to the epidemic, according to the instructions of the national epidemic prevention work, some towns and townships in Changfeng County have taken measures to close the roads. Because it is just in the season of strawberry market, strawberry export has been greatly affected, so it is urgent to develop strawberry e-commerce.

Table 1. Current situation of strawberry products in Changfeng County

Degree of processing	Product source	Capacity scale	Homogeneous competition degree	Brand coverage	Proportion of online sales	Circulation cost
Strawberry fresh fruit	Farmers produce and sell themselves	High	High	High	Low	High
Primary processing products	Purchase from farmers, produce and sell by enterprises	Medium	High	Hig	Medium	High
Deeply processed products	Purchase from farmers, produce and sell by enterprises	Medium	Medium	Medium	Low	Medium

3.2.2. Few professionals and lack of professional knowledge guidance

If we want to vigorously develop e-commerce, the talents needed for industrial development are also changing imperceptibly. More importantly, we need professional talents who understand omni-channel sales, and technical talents who comprehensively master the skills of live delivery, Internet operation and promotion, Taobao after-sales service, background data analysis, short video editing and other knowledge. However, due to the weak e-commerce foundation of Changfeng Strawberry itself, the original offline work is mainly in the greenhouse, the working environment is poor, and there are few talents with medium and high-end knowledge. In addition, there are many left-behind people in rural areas with low educational background and slow knowledge acceptance and transformation, which has hindered the development of rural e-commerce.

3.2.3. The marketing mode is backward and the content e-commerce is not effectively carried out

The e-commerce marketing model is affected by many factors, such as the level of science and technology, professional talents, and equipment. However, Changfeng County, where Changfeng strawberries are produced, has a large number of left-behind personnel, and the number of professionals mentioned above is small. Therefore, the e-commerce marketing model is backward, with a single content, and adopts traditional methods, such as Taobao online store sales. Although Changfeng Strawberry is of high quality, it is difficult to stand out from many competitors online. Therefore, it is very important to innovate the e-commerce marketing mode and diversify the e-commerce sales content, so as to bring high-quality agricultural products such as Changfeng Strawberry into the public's view.

3.3. Problems in cold chain logistics

3.3.1. Incomplete infrastructure

The government of Changfeng County will allocate 20 million yuan to support the strawberry industry every year, and launch various kinds of bonus and subsidy funds of 285 million yuan to develop the strawberry industry chain. However, there are only more than 30 primary processing bases established in Changfeng County, and the cold storage facilities are extremely simple. Changfeng strawberry has an annual output of 350000 tons and is seasonal. On average, each base needs to process 32 tons of strawberries every day, with a huge workload. In addition, the cold storage capacity and internal facilities of the base are not perfect, which makes it difficult to guarantee the quality of strawberries when they are delivered to customers. According to the query, the capacity of China's cold storage in 2021 is 52.24 million tons, which is huge, but the volume of Anhui Province is only 1.43 million tons, which is far smaller than the surrounding provinces. There are only 3 large-scale cold storage enterprises in Changfeng County, and the cold storage built is mostly used for frozen meat storage. There are 35 large-scale cold storage enterprises in Hefei. The cold storage resources are in short supply, and the cold chain equipment is far from developed regions. Anhui Province is a major agricultural province, and the development of industry and tertiary industry is sluggish. There is a serious structural imbalance in the promotion and use of cold chain technology. The processes such as transshipment and transshipment are often separated from the cold chain, Hefei cold storage resources are insufficient, and the distribution and function of cold chain logistics facilities are seriously unbalanced. In short, Anhui's cold chain infrastructure is difficult to meet the demand of the fresh food market.

3.3.2. Incomplete cold chain logistics system

Anhui has developed rapidly in recent years, Hefei has become a new first-tier city, and the strawberry planting base in Changfeng County has also gradually developed, with the annual output rising. At this stage, the main contradiction lies in the contradiction between the increasing production and upgrading of agricultural products and the increasing demand for fresh fruit and the backward logistics and transportation. In 2022, Shunfeng Cold Transport LTL will open only 51 cities for interconnection, and its business scope in Hefei is still small, which cannot meet the logistics needs of fresh agricultural products. The cold storage and transportation technology of local logistics companies is far from meeting the requirements, which is reflected in the small and scattered main body of the cold chain industry, uncontrollable transportation process, most of the fresh agricultural products Changfeng strawberries still use the traditional transportation mode, have not formed a complete system, have not used new technology, and so on, as well as the shortage of talents and low quality, and the cold chain logistics has not yet formed a complete system.

3.3.3. Strawberry quality monitoring is not comprehensive

The cold chain logistics service objects cover a wide range, including milk, meat, poultry and fresh fruit. The storage and transportation of these goods have their own standards, and vegetables and fruits are sensitive to temperature and humidity. It is not difficult to see from the product evaluation of Taobao, JD.com and other shopping platforms that customer evaluation mainly focuses on taste and freshness. When the logistics selected by the strawberry merchant cannot meet the customer's needs, the customer will give a business trip evaluation. There are many reasons for these problems. The main reason is that Changfeng strawberries entered the cold chain after simple treatment without deep preservation. Berry farmers need to pay attention to this problem, and rely on logistics companies to strengthen the early quality monitoring.

3.3.4. Incomplete cold chain logistics information platform

Changfeng Strawberry Base has only developed e-commerce in recent years, and the traditional logistics model is difficult to meet diversified needs. The demand for strawberries is growing, and the number of orders is huge. A large amount of data needs to be processed during the transportation management process. The strawberry logistics cycle is short, and there are many circulation links. The data needs to be processed regularly and timely. However, the information platform technology of Changfeng Strawberry Base is imperfect, and the collection of information data is incomplete, which makes the sharing of information blocked and the utilization of resources inadequate, and hinders the e-commerce sales of Changfeng Strawberry. Due to the variety and types of data and information and the complicated process, there are also differences in information collection technology. The accurate use of big data technology is conducive to the sorting and analysis of strawberry cold chain logistics information.

4. Optimization Scheme of Changfeng Strawberry "Fresh E-commerce+Cold Chain Logistics"

4.1. Optimization measures for strawberry farmers

4.1.1. Packaging optimization

(1) Highlight brand characteristics. Brand is the most intuitive endorsement of the product. There are many kinds of strawberries circulating in the market. In order to make Changfeng Strawberry occupy the market share, we must pay attention to brand building. First of all, relevant government departments can collect brand cartoon images and unique LOGO that conform to the appearance characteristics of Changfeng Strawberry, and then vigorously promote the exclusive trademark of Changfeng Strawberry to make the original Changfeng Strawberry shake off the defective products in the market. In terms of packaging image, we should use a lot of LOGO and brand image, and strive to achieve the effect that consumers can't help thinking of Changfeng Strawberry when they see the image.

(2) The packaging materials are diversified. Packaging materials are the key to opening a special market for strawberries. Different materials are suitable for different people and scenes. Kraft paper can be used as the basic model. Kraft paper has always been the traditional packaging paper. Its main advantages are that it can be recycled for green development and the material itself has a retro sense of sophistication. On it, you can customize and print the patterns that customers like or businesses need, exquisite and advanced. Bamboo is also a suitable material. It can be cut into bamboo pieces and woven into a box. It is soft and moisture-proof and not easy to rot and mildew. What is more valuable is that it can be recycled. It is a green material that conforms to the concept of sustainable development. Bamboo packaging is also attractive. Its color presents a light cyan color with natural patterns. It is used to package

strawberries. Light cyan and red color reflect each other, and the sweet and sour of bamboo and strawberries interweave, giving people the ultimate experience in visual sense.

(3) Subdivision, positioning and precise packaging. Different people have different needs, and Changfeng Strawberry needs precise marketing. Strawberries are suitable for all ages and have great market potential. For children's consumption, businesses should try to choose cartoon style packaging. Characters in cartoons such as Peppa Pig, Xiong Da Xiong Er and Little Princess Sophie should be printed, and their nutritional value should be highlighted in text publicity to attract parents to buy. At the same time, the number of strawberries in a box should not be too large, so it is appropriate to choose small packaging; For young people, affordable strawberries can be selected. Most of the young people bear a lot of work pressure and their income is not very high. They will choose to avoid high-end product consumption. Merchants should try to keep the packaging simple, follow the minimalist style, highlight the strawberry itself, and focus on its sour and sweet taste to relieve pressure; Middle-aged and elderly people are also huge consumer groups. They are willing to invest in health care and spend energy on health care. This kind of packaging should highlight health care, with ecological health, festive and generous illustrations. Middle-aged and elderly people are willing to invest in health and consumption stability, and are key sales groups.

According to the ripening time of strawberries, the selling time can include Spring Festival and Valentine's Day. There should be special packaging at this special time. In the Spring Festival, we should highlight the festive health, Valentine's Day highlight romance, and its packaging should take the luxury route to use gift boxes to highlight the texture.

4.1.2. Picking optimization

Picking is the first process of strawberry circulation. If you do not pay attention, it will cause unexpected losses. Before harvest, use 0.1%~0.5% calcium chloride solution to spray the fruit to prevent the strawberry from softening. The harvest should be carried out in batches according to the fruit maturity. It is best to pick after the dew dries in the morning or near the evening. When picking, remove the calyx from the fruit handle to avoid touching the fruit with fingers. Strawberries should be graded while picking to minimize mechanical damage caused by turning. Do not turn the strawberries after putting them in to avoid damaging the peel. After the fruit basket is full, it should be treated and precooled in time, and then stored in the cold storage or transported.

4.1.3. Improve the level of employees

(1) Specialization of planting skills. It is necessary to introduce strawberry planting professionals, form a cooperative team to build a research institute, and even cooperate with universities to carry out targeted cultivation to improve and promote standardized strawberry production. The University of Science and Technology of China and Anhui Agricultural University have advanced equipment technology and knowledge reserves in Hefei. The local government can organize farmers and universities to carry out technical exchanges and training, improve students' willingness to work and entrepreneurship and local production technology level, and improve the structure of employees.

(2) The sales level is modern. Online sales have opened a new world of agricultural product sales, and the smooth logistics system has broken the distance barrier to allow fresh food to fly everywhere. The promotion of e-commerce is imperative. We should improve the enthusiasm of employees in Changfeng County to participate in e-commerce, and let online sales grow. Government departments can improve farmers' awareness and sales skills by organizing various forms of e-commerce training, actively guide farmers to settle in e-commerce platforms, open independent e-commerce online stores and even live sales. It is also necessary to adjust measures to local conditions and not blindly follow the path of e-commerce sales. It is more suitable for farmers with small planting scale to choose e-commerce, while it is more suitable

for farmers with large planting scale to choose e-commerce sales with unsalable risks, and e-commerce platform is more suitable as an auxiliary.

(3) Policies guide logistics cooperation. The government should actively assume the responsibility for development and take the initiative to lead the leading logistics companies to carry out cooperation negotiations to improve the confidence of farmers' e-commerce participation. At the same time, relevant departments should actively promote the collaborative information platform of e-commerce and logistics distribution to protect the legitimate rights and interests of farmers, and smooth the communication channels between farmers and logistics companies.

4.2. E-commerce mode optimization

4.2.1. Use the Internet platform

At some level, the development of all industries cannot be separated from the network. In addition, this new sales model of rural e-commerce not only opens up a new way for the sales of agricultural products, but also has the advantages of fast and high efficiency, avoiding the problem of untimely connection of offline sales demand. Nowadays, online live broadcasting is more and more popular. Live broadcast and short video can be used to open a new breakthrough for the e-commerce sales of Changfeng Strawberry. Farmers can reproduce the growth process, picking, processing, packaging, transportation and other links of Changfeng strawberries by means of short video and live broadcast, so as to make the whole production and distribution channel of products transparent, so that consumers can better believe in the safety and quality of Changfeng strawberries and promote sales; At the same time, in the process of live sales, farmers can introduce the products on the spot, answer the questions raised by consumers, and consumers can purchase on the platform at the same time, which effectively reduces many links in the traditional marketing model, brings better consumer experience to consumers, and promotes product sales. Especially in today's era affected by the epidemic, it has become a hard demand for consumers to buy goods without leaving home. On mobile phones, people can browse and buy goods through Taobao, Kwai, Tiktok and other platforms. Under the background of "Internet plus" era, agricultural e-commerce can make good use of agricultural characteristics and vigorously develop Changfeng strawberry, which can change people's employment mode, promote rural economic development with knowledge economy and improve people's living standards. How to take advantage of this opportunity to develop Changfeng Strawberry mainly starts from the following aspects.

(1) The live broadcast is taken from the original place. Changfeng strawberry is a specialty of Anhui Province and one of the characteristic fruits of Anhui Province. Its origin is located in Changfeng County, north of Hefei City, Anhui Province. It belongs to the subtropical monsoon climate, with obvious monsoon, four distinct seasons and beautiful environment. It is a national high-quality pollution-free strawberry production demonstration base. Therefore, in the process of online live broadcast sales, we can take a view of the original place, use the local beautiful natural environment, and explain in the real strawberry growing environment, so that consumers can better understand Changfeng Strawberry, use the consumer's tendency to purchase the original ecology of the product, let consumers feel that this is a real pollution-free agricultural product, and speed up the consumer's purchase decision. On the other hand, the beautiful natural environment where Changfeng Strawberry grows is presented in the live broadcast room, which can attract consumers' attention and increase traffic. It is a natural advertising sign for live broadcast sales, and also a very low-cost drainage method.

(2) Strengthen the uniqueness of live broadcast content and eliminate homogenization of content. Nowadays, there are many live broadcast sales of agricultural products on the Internet, and many live broadcasts will lead to the problem of content homogeneity. To stand out in many live broadcasts, we must find the unique content of Changfeng Strawberry to attract consumers'

attention. For example, we can focus on the growth characteristics of Changfeng Strawberry. The planting of Changfeng Strawberry is based on the internationally advanced seedling raising methods. The whole growth process does not use pesticides. It is green and environmentally friendly, with high quality, and in line with the purpose of sustainable development of national ecological agriculture. Changfeng Strawberry also won the title of "Top Ten Tasty Strawberries" at the Second International Strawberry Brand Conference. Live broadcast around this unique content, not only has unique content, but also allows consumers to feel the reliability of Changfeng Strawberry in quality, safety and other aspects, thus improving the stickiness of fans.

(3) Assist with short video. In order to further develop the e-commerce sales model of Changfeng Strawberry, in addition to live broadcast sales, short video assistance is also necessary, which can better achieve the purpose of expanding publicity and attracting traffic. Generally speaking, short videos for selling goods include two types: one is for the purpose of drainage and preheating, and the other is for the purpose of hot money publicity. The two types of video have great differences in the focus of content. For the video of the diversion and warm-up type, the following points should be noted in the content: First, the time and method of live broadcast should be announced by the way of the anchor's appearance, so that subsequent consumers can enter the live broadcast room and interact with the anchor. 2、 Publish suspense and seductive content in short videos to attract the attention and curiosity of fans, so as to better build momentum for live broadcast activities. Attract more people to the studio. 3、 Shoot short video tidbits related to live broadcast. For example, you can shoot the tidbits around the appearance of Changfeng Strawberry and the price of the event, and release them in the first few hours of the live broadcast activity, in order to improve the participation of consumers in live broadcast in this "eye-catching" way. For short videos aimed at the promotion of hot money, it is necessary to accurately locate and lock the hot money in content, grasp the needs of consumers, and publish them regularly, so as to attract more consumers' attention and direct the flow of live broadcast activities. In view of the short shelf life of strawberries, the difficulty of cold chain logistics and other practical problems, we must do a good job in the early stage of the short video, and do a good job in the content planning of the video, in order to better create conditions for the following live marketing activities.

4.2.2. Increase talent introduction and support

For the e-commerce development of Changfeng Strawberry, the talent problem must be solved. The report of the 19th National Congress of the Communist Party of China put forward the "implementation of rural revitalization strategy", including the talent revitalization strategy, which shows that in the current era, rural e-commerce is the key point to promote the revitalization of rural industries, and the cultivation of e-commerce talents has also received national attention. With the support of national policies, the talent cultivation of Changfeng Strawberry E-commerce has also gained focus and support. Mainly from the following two aspects

(1) We will play a policy-oriented role. Under the guidance of the government, give full play to the policy-oriented role, establish multiple Internet sales platforms, and increase the employment opportunities of talents in various agriculture-related posts. In addition to utilizing existing talents, it is also necessary to provide a platform for those who are willing to learn more to work and learn knowledge and skills. We will do a good job in guiding the technology of the Strawberry Park in Changfeng County, organize and carry out live broadcast skills, off-site monitoring and other training for many times, and build a talent team by relying on the talents we have introduced and through external introduction and internal training.

(2) Increase talent support. Do a good job of talent introduction mechanism. Hefei, as the capital city of Anhui Province, has the advantage of attracting talents in its geographical location, and has a good resource advantage of university talents. The development of Changfeng Strawberry

e-commerce needs to grasp the resources of various colleges and universities, carry out offline or online recruitment for e-commerce sales, carry out college student recruitment activities, and give higher salaries to attract new graduates majoring in online media, big data, new retail and e-commerce from the perspective of geographical location and salary. In addition to college students, the supply of e-commerce talents can also be social unemployed, self-employed businesses, rural farmers and farmers, and rural left-behind personnel. This can further tap the potential resources and talents of rural e-commerce, maximize the use of rural resources, improve the service system of rural e-commerce, and promote better sales of agricultural products.

(3) Implement brand marketing strategy. To develop rural e-commerce, it is also necessary to implement the brand marketing strategy. Whether consumers buy e-commerce products is largely affected by brand awareness and popularity. Changfeng Strawberry itself has a high brand awareness. For example, Changfeng County has the titles of "Strawberry Capital of China", "Advantage Area of Anhui Province's Characteristic Agricultural Products", "Strawberry Hometown of China", and is the largest county of strawberry production in China. Therefore, we should grasp this advantage, increase publicity and improve the recognition of consumers in the development of e-commerce, which can play a multiplier effect on the development of e-commerce of agricultural products.

4.3. Cold chain logistics optimization measures

4.3.1. Improve the strawberry e-commerce logistics system

The logistics system affects the willingness of strawberry farmers to develop e-commerce. Research shows that a perfect e-commerce logistics system can often increase the willingness of strawberry farmers to develop e-commerce. The e-commerce logistics system of the origin includes the construction and operation of cold storage, short-haul transportation, cold-chain express, etc.

(1) Cold storage construction. Changfeng Strawberry Planting Base should vigorously improve the cold storage facilities, pre-cool the strawberries at the front end of the supply chain and provide a temporary storage environment for strawberries to maintain the taste and quality of strawberries to the greatest extent.

First of all, this is a simple mathematical calculation. Assuming that the daily output of Changfeng strawberries is sold out, we calculate the daily average output based on the annual output:

$$\bar{X} = \frac{\sum_{i=1}^n x_i}{t}$$

Where, x_i is the output in the i th year; t is the number of days in a year.

$$\bar{X} = \frac{350000 \times 19.2\%}{365} = 184.1 \approx 184(\text{ton})$$

Generally, the storage capacity of 186 tons of strawberries is 1116 m³, based on the calculation of 6 m³ for storing 1 ton of strawberries, and the reserved area of the passage between the strawberries harvesting boxes and the passage area of the forklift.

The cost estimation table of the common cold storage is as follows:

Table 2. Cost estimate of common cold storage

Scale (1/m ³)	Scale grade	Cost (yuan)
10-50	Small	1400-3000
100-500	medium	900-1300
1000-5000	large	800-1000

According to the layout of Changfeng Strawberry Garden Base, the location of cold storage construction in Changfeng County can be set at the intersection of the southwest-northeast

traffic line and the north-west-southeast traffic line, and the number of cold storage should be 2 or 3. Label the refrigerator with serial numbers 1, 2 and 3 from left to right.

Scheme 1: If two cold storage are built, one large and one medium, the cost is estimated to be $1 \times 800 + 1 \times 1000 = 1800$ (yuan).

Scheme 2: If three cold storage units are built, one for large and small scale, the cost estimate is: $1 \times 800 + 1 \times 900 + 1 \times 1640 = 3340$ (yuan).

Scheme 3: If three cold storage, one large-scale and two medium-scale, are constructed, the cost estimate is: $1 \times 800 + 2 \times 900 = 2600$ (yuan).

Through the comparison of the schemes, on the premise that the daily output of Changfeng strawberries is all sold out, Scheme I is the most cost-effective. Therefore, it is recommended that Changfeng County build two cold storage, one large and one medium.

According to the principle of convenient transportation and the principle of maximum utilization of cold storage, the construction location of cold storage is suggested to be medium cold storage in location 1 and large cold storage in location 2. If Changfeng strawberries cannot be sold out on the same day, the calculation results of the above steps can be repeated according to the historical maximum inventory records, and the type, quantity and location of cold storage construction can be determined according to the actual situation.

High-value fruits like strawberries can be stored in cold storage or controlled atmosphere storage, which can last longer and bring higher profits.

(2) Cold storage operation. Cold storage is mainly used for trade and storage of fresh products. Trade business: Changfeng strawberries are deeply loved by consumers. They are distributed to the market and supermarkets offline and sold online. Storage business: For slow-moving Changfeng strawberries, they can be temporarily stored in cold storage. In addition, Changfeng has other fresh agricultural products, which can also be temporarily stored in the cold storage, paying a certain storage fee, and making full use of the cold storage resources.

Cold storage operation requires water, electricity and equipment. Refrigeration equipment, deep water wells, transformers, etc. need to be purchased or built. Workshop anti-collision piles, warning signs and standard operation manuals, cold storage work clothes, fire extinguishers, etc. shall also be installed in the cold storage. Equipped with refrigerated truck for strawberry transportation, additional refrigerant and heat preservation board are purchased. In addition, the operation of cold storage requires business personnel and administrators. Do a good job in equipment maintenance.

(3) Short inverted transportation. Short reverse transportation means short distance transportation. When the distribution distance of some strawberry orders is less than 300km, the logistics cost of cooperation between strawberry farmers and logistics enterprises will be higher than the logistics cost of their own distribution. Therefore, when the vehicle equipment and time are sufficient, the berry farmers can deliver by themselves. When the equipment and time are insufficient, strawberry farmers can also rent individual transporters for strawberry distribution. The forms of distribution are flexible and diverse, which can effectively reduce costs, improve efficiency and improve consumer satisfaction.

(4) Cold chain express. A complete e-commerce logistics system needs to build a complete logistics express system. Strawberries are not easy to store, which determines that logistics companies need to use cold chain vehicles and other cold chain equipment in long-distance transportation. The logistics company should deliver strawberries in time to ensure their freshness. The incubator can be properly added during delivery to prolong the storage time of strawberries. For regions with large demand, logistics companies can appropriately increase express outlets. In order to make better use of third-party logistics enterprises' professional distribution of strawberries, berry farmers can establish long-term partnerships with cooperatives and e-commerce enterprises.

4.3.2. Establish and improve the quality monitoring system

To ensure the safe, efficient and high-quality delivery of strawberries, we should improve the quality monitoring system, ensure that strawberries are still fresh when they are delivered to customers, and provide customers with satisfactory express transportation and distribution services. There should be scientific and reasonable quality operation standards and requirements for cold transportation. Strawberry farmers can spontaneously set up multiple quality inspection teams and set up a team leader. Each inspector shall clarify the responsibilities and division of labor, supervise and be responsible for the strawberry production base and strawberry processing base, and form a horizontal to human, vertical to the bottom grid management. Conduct regular spot check on strawberries sold by e-commerce to ensure proper temperature and humidity. Strengthen the supervision of strawberry precooling and publicize the importance of precooling. The quality control of Changfeng Strawberry is not limited to temperature control. The logistics company should contact strawberry farmers and relevant professional institutions to study the logistics technology and quality monitoring system applicable to the transportation of Changfeng strawberries after in-depth investigation. The following are the suggestions:

(1) Pre-cooling after picking. Use wireless sensors to collect the data of pre-cooled strawberries and transmit the data to the Internet of Things information management platform in real time. Through the data system of the management platform, the temperature and humidity conditions of strawberries can be accurately controlled to guide the storage of strawberries.

(2) Cold chain transportation. In the process of strawberry loading, unloading and transportation, infrared sensors are used to measure strawberry temperature, and RFID and GPS technologies are used to locate strawberries in real time. The collected information is transmitted to the information management platform of the Internet of Things, and the records are sorted and sent to the data platform for real-time supervision to ensure the quality of strawberries.

(3) Cold storage. The changes in strawberry warehousing and delivery and the changes in return and exchange inventory are made in real time using the Internet of Things technology. Sensors are used to collect the temperature and humidity of strawberry storage. Use barcode technology and infrared technology to locate strawberries.

(4) Terminal distribution link. The strawberries identified by EPC technology are tracked by RFID technology and GPS during transportation and distribution. When consumers receive strawberries, they can open their mobile phones to scan the code or log in to the strawberry information platform to query the strawberry information. The information of strawberry picking, transportation, distribution and so on is open, and consumers can also buy at ease.

4.3.3. Build cold chain logistics information platform

Based on big data technology, build a cold-chain intelligent logistics information platform that serves the sales of strawberry farmers, providing a strong guarantee for the strawberry logistics and transportation process. Big data technology is used to analyze, transmit and share data and information such as storage, logistics process and distribution, so as to ensure the intelligent operation of the cold-chain intelligent logistics information platform for Changfeng strawberry e-commerce sales, realize the supervision of the whole process of Changfeng strawberry cold-chain logistics, and reduce the loss of Changfeng strawberry quality.

Build Changfeng strawberry cold chain intelligent logistics and warehousing information platform. Use big data technology to improve the storage management of Changfeng strawberries, reasonably optimize the design of the internal layout of the warehouse, scientifically monitor the storage temperature, update the strawberry storage information in real time, and introduce automatic sorting technology to improve the efficiency of strawberry

storage management, so as to build an intelligent strawberry storage management system to provide guarantee for the e-commerce sales of strawberries.

Build Changfeng strawberry cold chain intelligent logistics and transportation information platform. Proper loading scheme and vehicle temperature monitoring can effectively reduce the quality loss of Changfeng strawberries. According to the traffic volume limit and vehicle center of gravity, plan the placement of strawberries. The temperature control device is installed in the transport vehicle, and the temperature and strawberry quality in the vehicle are monitored and processed in real time during the logistics circulation operation to reduce the loss of strawberry quality.

Build Changfeng strawberry cold chain intelligent logistics and distribution information platform. Add GIS, GPS and other information technology positioning in the distribution process, the last link of strawberry sales, to monitor the distribution progress of strawberries in real time, use the theory of operational research optimization algorithm to reasonably allocate resources and businesses, realize the sharing of information resources, improve the distribution efficiency of strawberries, and reduce the distribution cost.

5. Conclusion

With the development of the Internet, online shopping has become more and more convenient, and the market of Changfeng Strawberry has also been further expanded. In the past, most of Changfeng strawberries were sold locally and a few were sold online. In recent years, the epidemic has caused a large number of strawberries in Changfeng County to be unsalable. In order to avoid wasting strawberries and damage the interests of strawberry farmers, this paper analyzes from many aspects, hoping to combine fresh e-commerce with cold chain logistics, and put forward effective suggestions to help the smooth flow of strawberries in Changfeng County. Based on the summary of various relevant documents and the strawberry sales situation in Changfeng County, the following problems are found and corresponding measures are given. First, strawberry farmers are not professional and backward in planting, picking and pretreatment; Second, the e-commerce model is single and lacks talents; Third, the cold chain logistics infrastructure is imperfect, and the logistics system and information platform are missing.

According to the research, we give the following optimization plans: first, optimize the packaging and picking, and train employees; Second, use the Internet, national policies and talents to vigorously develop e-commerce; Third, improve the cold chain logistics infrastructure and build a logistics system. Although our ability is limited and the plan we wrote is not necessarily effective, we still hope to help the berry farmers and reduce the losses caused by slow sales as much as possible.

In this Internet era, the scale of fresh food e-commerce is growing, and the development of cold chain logistics is irresistible. At present, cold chain logistics is in a period of rapid development. If Changfeng County can seize the opportunity, it is believed that Changfeng strawberries will appear on the table of every household in the future. The strawberry farmers will no longer worry about unsalable sales. The economy of Changfeng County continues to develop. I wish Changfeng County better and better!

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